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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/039,309	11/07/2001	Eiji Sato	45672/56.682	2127

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EXAMINER

MONDT, JOHANNES P

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 09/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/039,309

Applicant(s)

SATO ET AL.

Examiner

Johannes P Mondt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11/7/1.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The examiner has considered the items listed on the Information Disclosure Statement filed 11/07/2001. Please see signed statement included with this Office Action. However, it is kindly requested that the Foreign Search Report which Applicant alleges to have been included in said Information Disclosure Statement be made available: it was found to be absent in the electronic file.

Specification

The Specification is objected to for not showing any concave/convex surfaces of the substrates as recited in claim 8.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. ***Claim 8*** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In particular, the Specification refers to Figures 12 to show claimed concave/convex layers (cf. Embodiment 3); however, said Figures 12 do not show any concave nor any convex surfaces at all. "Convex", according to Merriam-Webster's Collegiate Dictionary, Tenth

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Edition (1998), is “curved or rounded like the exterior of a sphere or circle” or “being a continuous function or part of a continuous function with a property that a line joining any two points on its graph lies on or above the graph”. This is, however, not true for Figure 12, first because the first definition of convex as given above is not met because there is no rounded section of 24, and second, because the second definition is not met, as can be seen from Figure 12A by connecting the right-most point on 24 with the left-most lower corner point on 24, which produces a line intersecting 24.

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim 4** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the verbiage “discontinuously” (line 3) renders claim 4 indefinite, because in any given embodiment gradients are continuous, the notion of discontinuity being essentially an issue of scale. Applicant’s disclosure does not define the boundaries of gradient values beyond which the thickness is to be considered “discontinuously” changing.
3. **Claim 8** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the verbiage “closer” is in need of further specification, being of a comparative nature, without which “closer” is indefinite.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. ***Claims 1-2, 4-6 and 8-9*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Khan et al (6,377,321) in view of Okada et al (JP406102485A). Khan et al teach a liquid crystal layer 22 (cf. col. 10, l. 42-47); a pair of substrates, e.g., 12 and 14 (cf. col. 10, l. 34-53), so as to interpose the liquid crystal layer there between, and a plurality of pixels arranged in matrix pattern (inherently so when the electrode configuration is in matrix pattern) (cf. col. 11, l. 5-19), wherein: the liquid crystal layer “has a helical structure” in the sense as disclosed by Applicant, i.e., has molecules with helical symmetry in it (cf. col. 9, l. 53 – col. 11, l. 3) (N.B.: inherently, cholesteric molecules have helical axes) and exhibits at least two stable states including a planar state and a focal conic state according to an applied voltage (cf. col. 15, l. 36-51).

Khan et al do not necessarily teach a thickness *d* in each of the plurality of pixels to have to different values and the liquid crystal layer to include at least two regions having different values of a first threshold voltage for transitioning from the planar to the focal conic state.

However, the provision of thickness gradients within the liquid crystal layer so as to achieve a first threshold voltage difference for two regions within said liquid crystal

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layer would have been obvious in view of *Okada et al*, who teach said thickness to have a gradient in the liquid crystal layer, and thus have at least two different values (in fact all values between d_1 and d_2), as a means to achieve a gradient in the threshold voltage (cf. English abstract, "Constitution" and Figures 7 and 8(a)), and hence at least two different values in said threshold voltage.

Motivation to include the teaching by *Okada et al* into the invention by *Khan et al* stems from the desirability to avoid display instability, as explained by *Okada et al* (cf. English abstract, "Purpose"), while unstable displays are generically disadvantageous in the art of liquid crystal displays. *Combination* of said teaching with said invention is straightforward: the liquid crystal display by *Khan et al* also relies on helical molecules, being of the chiral nematic liquid crystal variety (cf. abstract), while variation, in particular the inclusion of a thickness gradient is easily achieved over the spatial extent of a cell. *Success* in implementing the combination can therefore be reasonably expected.

On claim 2: although the condition $d > P$ necessarily must be observed so as to exploit the helicity of the molecules for the simple reason that otherwise no helicity is present across the liquid crystal layer, and although Applicant has included an explanation for the inclusion of the further limitation $d/P < 15$, the number 15 in said limitation has not been explained in the disclosure. Therefore, Applicant's disclosure does not teach why the range as claimed is critical to the invention. In view of the absence of a teaching why a range is critical to the invention Applicant is reminded that it has been held that where the general conditions of a claim are disclosed in the prior

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art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

On claim 4: any discontinuous change is an abstraction from a continuous change. Applicant does not delineate above which value of the gradient the change of thickness in the liquid crystal layer is considered discontinuous, and hence the claim must be considered indefinite, as expressed elsewhere. Moreover, a very large local gradient is defined by a range limitation. Applicant's disclosure does not teach why the range as claimed is critical to the invention. In view of the absence of a teaching why a range is critical to the invention Applicant is reminded that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

On claim 5: while it is understood and while the examiner takes official notice that in the art of liquid crystal displays the thickness of the liquid crystal layer should be at least be considerable fraction of the pitch of the helical molecules in order that said liquid crystal layer can perform its function (said helicity is the essence of said liquid crystal layer), Applicant does not specifically disclose the criticality of the factor 0.5 in the range limitation that is the essence of claim 5. Therefore, Applicant's disclosure cannot be said to teach why the range as claimed is critical to the invention. In view of the absence of a teaching why a range is critical to the invention Applicant is reminded that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

On claim 6: in Okada et al the value of the thickness changes continuously across the pixels (cf. Figure 8a).

On claim 8: the upper surface of the lowest of the two substrates in Figure 7 by Okada et al is concave.

On claim 9: the top surface of the bottom substrate in Figure 7 is concave, while the bottom surface of the top substrate in Figure 7 is both concave and convex according to the second definition of convex cited from Merriam-Webster (see rejection under 35 U.S.C. 112 of claim 8 given above).

3. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Khan et al and Okada et al as applied to claim 1 above, and further in view of Masazumi (6,414,669). As detailed above, claim 1 is unpatentable over Khan et al and Okada et al. Neither Khan et al nor Okada et al necessarily teach the further limitation as defined by claim 3. However, it would have been obvious to define the thickness d in the manner as defined by claim 3 in view of Masazumi, who teaches in the analogous art of liquid crystal display devices with cholesteric phase (cf. col. 1, title and abstract) that the said first threshold voltage (" V_{th2} " in Masazumi, cf. col. 2, l. 1-23) for transitioning to the focal conic state is less than the second threshold voltage (" V_{th1} " and V_1 in Masazumi, loc. cit.) (cf. Fig. 37).

Motivation to adhere to the teaching by Masazumi in this regard for the entire range of thicknesses is not to upset the driving method: if the condition that forms the basis of this claim were not met then for some portions of the pixel the homeotropic

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state would be achieved while other portions would remain in the focal conic state, which cannot be the intention of any liquid crystal device. Combination of the teaching by Masazumi in this regard in the invention by Khan et al and Okada et al is readily achieved by proper bracketing of the thicknesses in the liquid crystal layer. Success in implementing the combination can therefore be reasonably expected.

4. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Khan et al and Okada et al as applied to claim 1 above, and further in view of Scherer et al (5,880,801). As detailed above, claim 1 is unpatentable over Kahn et al and Okada et al, who do not necessarily teach the further limitation of claim 7.

However, it would have been obvious to include said further limitation in view of Scherer et al, who teach top and bottom substrates 42 and 44, respectively (cf. col. 4, l. 20-60) to be aligned horizontally and vertically, respectively, so as to achieve hybrid-aligned cells by which an electro-optic response is achieved at low voltage compared with a device with pure homogeneous alignment (cf. col. 3, l. 29-47).

Motivation to include the teaching by Scherer into the invention by Khan et al and Okada et al in this regard stems from the desirability to achieve response at low voltage (Scherer, loc.cit). Combination of said teaching and said invention is straightforward through the process to make HAN crystal cells as disclosed by Scherer et al (cf. col. 3, l. 7-47). Success in implementing said combination can therefore be reasonably expected.

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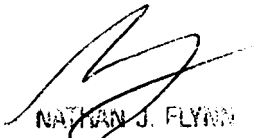
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P Mondt whose telephone number is 703-306-0531. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 703-308-6601. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JPM
September 6, 2003


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